MYRMECOPHILY IN LYCAENID BUTTERFLIES (LEPIDOPTERA : LYCAENIDAE)

By Stephen F. Henning*

(*Concluded from p. 222*)

The second species, *Lepidochrysops ignota* (Trimen) is a small brown butterfly with a greyish underside. Its distribution is limited to areas where its host plant *Becium obovatum* (Benth) N.E.Br . (Labiatae) and its host ants *Camponotus niveosetosus* Mayr occur together. It has a slow zigzag flight, sometimes rapid, near the ground. It often rests on the ground, or settles on the flowers to feed. *L. ignota* females were mainly observed to oviposit on flowers of *B. obovatum* continually visited by *C. niveosetosus* workers.

An *L. ignota* females would flutter around the flowers. She would alight briefly and pass her antennae over the buds and flowers, and if conditions were satisfactory would curve her abdomen around and lay a single egg. To establish whether it was the presence of the ants that induced the laying a similar experiment to the one carried out on *A. dentatis* was tried.

Twenty female *L. ignota* were captured. Ten were placed in a container with the foodplant *B. obovatum* alone and ten with foodplant plus host ants. The results were not as clear cut as in the case of *A. dentatis*, because *L. ignota* proved to be rather fragile. *A. dentatis* lived as long as three weeks in captivity, while not a single *L. ignota* female lived longer than five days. With *A. dentatis* some females took as long as a week to settle down before starting to lay.

Of the ten *L. ignota* females housed with foodplant alone not a single egg was laid. Out of the ten females housed with the foodplant and ants three of them laid eggs. It appeared that the presence of the ants plus foodplant may be necessary to induce the *L. ignota* female to lay.

The eggs take about six days to hatch. The first and second instars feed on the seeds (achenes) enclosed within the dry persistent calyx of the plant. The only indication that there is a larva within the calyx is the hatched egg on the outside. After the moult to the third instar, the larvae disappear from the *B. obovatum* inflorescences and become associated for the remainder of their annual cycle (some 10-11 months) with the host ants.

Camponotus niveosetosus is diurnal and, in the field, third instar *L. ignota* larvae are encountered during the day by foraging workers. During the course of the study five third instar *L. ignota* larvae were placed on *Becium obovatum* inflorescences seen to be

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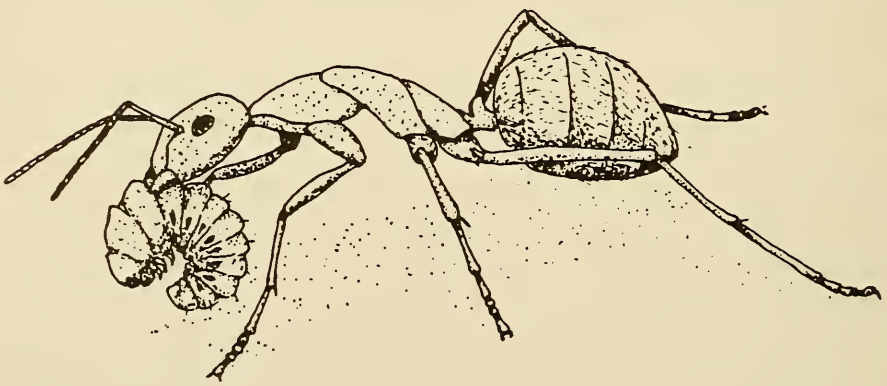
frequented by *C. niveosetosus* workers. It was observed that a foraging worker upon encountering one of the larvae on the inflorescences would touch and stroke it with its antennae usually in the vicinity of the honey-gland but also in the thoracic region. The ant would then proceed to make drumming movements (palpation) with its antennae in the vicinity of the honey-gland. The larva occasionally responded to this treatment by exuding liquid from the honey-gland which was consumed by the ant.

The third instar larvae used in these observations had already stopped feeding and had wandered off their foodplants. All five of these larvae were picked up and carried away by the ants. The larvae rolled themselves up when the ants attempted to pick them up by closing their mandibles between the last thoracic and first abdominal segments. This allowed the ants to carry the larvae with ease (Fig. 1). One worker carried a larva from the flower-head to its nest some 3 metres away. The other larvae were carried to nests within a 2 metre radius of the flowers.

In the nest the *L. ignota* larvae are deposited amongst the ant brood where they remain in the 'rolled up' position for some time. Later they crawl around between the brood of the ants. The larvae are at first investigated by some ants, but thereafter no more attention is paid to them than to the rest of the brood. While investigating the lycaenid larvae with their antennae the ants appear to concentrate on the thoracic and honey-gland areas. It has been suggested in the past that the ants pay more attention to the guests than to their own brood, but I was unable to confirm this from my own observations. The *L. ignota* larvae feed on ant larvae and pupae.

One example of what appeared to be trophallaxis was observed between an *L. ignota* larva and a worker ant. The larva raised its head so that its mouth-parts became visible. An ant was observed putting its mandibles on the mouth-parts for approximately thirty



Camponotus niveosetosus Mayr worker carrying a third instar *Lepidochrysops ignota* (Trimen) larva into its nest (after Henning, 1983a).

seconds, but whether there was actual exchange of liquid could not be determined. Claassens (1976) observed similar behaviour in *Lepidochrysops methymna* when brood was scarce in the nest.

Lepidochrysops larvae feed for the remainder of the summer on ant brood, but during winter when ant brood becomes scarce they undergo diapause. The larvae hang in a slightly contracted position from the roof of the nest where they spin a mat of silk to facilitate attachment of the prolegs. The ants cannot easily dislodge the larvae in this position. *Lepidochrysops* larvae start to feed again towards the end of winter when more ant brood becomes available, and *L. ignota* pupates some time in September or October. There is a peak in feeding activities of the larvae before pupation. The feeding and resting phase of *Lepidochrysops* larvae are intimately associated with ants, and appears to coincide with the main breeding seasons of the host ant.

Lepidochrysops larvae pupate in the tunnels of the ants nest. The adults, their wings still folded, run along the tunnels until they find the exit. The wings are expanded outside the nest.

Poecilmitis lycegenes (Trimen) is a bright orange butterfly with black spots and a pale brown underside. Its distribution is limited to areas where its host ant *Crematogaster liengmei* For. occurs. It feeds on several plants including the following: *Royena hirsuta* L., *Diospyros lycioides* Desf. (Ebenaceae); *Myrsine africana* L. (Myrsinaceae); and *Rhus* sp. (Anacardiaceae). The *C. liengmei* ants are often found tending coccids on these plants.

The female *P. lycegenes* appears to lay only where the *C. liengmei* ants occur, since the females have been observed to oviposit directly on the foodplant only when the ants were present. The females have also been observed to oviposit on stones and pieces of grass along the well established pheromone trails of the ants leading from their nests to the plants. One female was watched for two hours during which time she laid a number of eggs along the ants' pheromone trail. She laid on the ground, pieces of dead and living grass and stones all within 10mm of the trail. The ants generally followed the same path every day to and from the plants where they tended the coccids and the lycaenids. It appears that female *P. lycegenes* can detect the trail pheromone laid by the ants and oviposits near it, probably within the area of deviation by the ants.

The ants pick up the newly emerged *P. lycegenes* larvae and carry them to the plants, as other ant species have been recorded doing with homopterans. The young *P. lycegenes* larvae feed on either the upper or under surfaces of the leaves but, as they grow, they feed on the edge and later, starting from the tip, they eat the whole leaf. The young larvae shelter on the centre of a well concealed leaf. As the larvae get older they leave the plants during the day and shelter, usually several together and always attended by

ants, under nearby rocks. If the ants' nest is near enough they will shelter in it. The larvae find their way back to the plants by following the pheromone trails of the ants.

The honey-gland is present in the second and subsequent instars. The tubercles are present in all instars, developing from a simple elongated mole which can only be unfolded 'in and out' to a fleshy eversile projection bearing 8 spiculate setae. The larvae produce large quantities of liquid from the honey-gland upon which the ants feed. The ants are apparently necessary to keep the honey-gland clean because larvae kept in captivity without ants soon develop a fungal infection in the gland and die. An attempt was made to remove the excess fluid produced by the gland with a piece of blotting paper, but this procedure was usually unsuccessful.

Clark and Dickson (1971) record that the larvae pupate within leaf-shelters, but in a colony studied at Karkloof in Natal twelve pupae were found within the brood chamber of the ants nest, while only one was found on the host plant. The pupae are attached by their cremastral hooks and are dark brown to black in colour.

Although the above three examples give good overall picture of the type of ant/lycaenid associations to be found they are by no means the only ones.

For example, the larvae of *Euliphyra mirifica* Holland from West Africa live in the nests of the tailor ant *Oecophylla longinoda* (Latreille). From the observations made, it appears that *E. mirifica* larvae do not prey on the ant brood but are fed by the ant on regurgitated food. Pupation takes place within the ant nest.

Others, like the larvae of *Thestor dicksoni* Riley are entirely carnivorous on ant brood. The female *T. dicksoni* lays eggs on dry leaves and twigs and the newly hatched larvae are carried by their host ants, *Anoplolepis custodiens* Smith into their nests where they feed on the ant brood until they pupate. They pupate in the tunnels of the ant nest.

The larvae of *Thestor basutus* (Wallengren) are also entirely carnivorous, feeding on Jumping Plant Lice (Homoptera: Psyllidae) and ant brood. The eggs are laid singly or occasionally in small clusters on plants on which there are ants and Jumping Plant Lice. During the first to third instars the larvae live among the Jumping Plant Lice, upon which they feed, but on moulting into the fourth instar they enter the nest of their host ant *Anoplolepis custodiens* where they feed on ant brood. They pupate unattached in the ants nest.

The larvae of *Lachnocnema bibulus* (Fabricius) are also entirely carnivorous, preying on Leaf-hoppers (Homoptera: Jassidae). The eggs are usually laid singly just below colonies of adult and immature Leaf-hoppers. The newly emerged larvae make their way up the stem to where the Leaf-hoppers are congregated. In the early instars they

feed on Leaf-hopper eggs and small nymphs, but full grown *L. bibulus* larvae feed on both young and adult Leaf-hoppers. Clark and Dickson (1971) record that final instar larvae rear themselves up over a Leaf-hopper and suddenly pounce on it, or crawl up behind it and seize the wing tips. Ants (*Camponotus* sp.) are in constant attendance upon both Leaf-hoppers and the larvae. Ants have been observed to take what appears to be regurgitated liquid food from the mouth of *L. bibulus* larvae. They pupate on the leaves of the plant secured by the cremastral hooks and a silken girdle.

Larvae of other species are entirely phytophagous and although they are occasionally attended by ants are not dependent on them in any way. *Iolaus (Argiolaus) trimeni* Wallengren is a good example. The eggs are laid singly on the leaves of the parasitic plant *Tapinanthus rubrimarginatus* (Loranthaceae). The larvae at first feeds on the surface of a leaf, in troughs, filling the part eaten with its body, but as it grows bigger if feeds on the edge, wrapping the fleshy first segment round the edge of the leaf and completely covering its head. The final instar larva is black and grey-white and mimics a bird dropping. The larvae do not usually appear to be ant associated. The pupa is secured to a twig or the bark of the host-tree by the cremastral hooks only.

The larva of *Myrina silenus ficedula* Trimen is entirely phytophagous but is usually associated with ants but is not dependent on them. If feeds on several species of *Ficus* (Moraceae). The eggs are laid singly on a leaf or twig of the foodplant. The young larvae feed on the surface of a leaf, protected under a silken mat. The older larvae feed on the edge of the leaf, appearing to rely on their shape and coloration for protection. Young fruit are also occasionally burrowed into. The larvae are attended by various species of ant belonging to the genus *Camponotus*. The pupa is secured to a twig or to the bark of the tree, often among the tangled roots, by the cremastral hooks only.

The ants construct special structures on the plants to protect the larvae of certain species. *Poecilmitis brooksi* Riley shelters in small structures resembling miniature ants nests attached to the stem of its foodplant constructed by their host ant *Crematogaster peringueyi* Emery. *Spindasis namaqua* (Trimen) shelters in the soil at the base of its foodplant in 'brood chambers' constructed by their host ant *Crematogaster* sp.

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ENARGIA PALEACEA ESP. (LEP.: NOCTUIDAE) IN KENT. – This species has been noted in Kent on some half dozen occasions, but not in N. W. Kent for over a century. An exceptionally fine male was attracted to my garden m.v. light on the night of July 15th 1987, apparently a time of immigrant activity over Britain, although curiously, *Phlogophora meticulosa* L. was the only other probable immigrant noted that night. B. K. WEST, 36 Briar Road, Dartford, Kent.

MELANGYNA GUTTATA FALL. (DIPT.: SYRPHIDAE), ETC., AT CHARLTON, S. E. LONDON. – On 23.vi.83 I took an example (♀) of this delicate hoverfly, an uncommon species, from a goutweed umbel at the spot briefly described in 1983, *Ent. Rec.* **95**: 85, and have recently caught another (also ♀) flying about, and feeding from, a clump of hogweed in flower in a different part of Charlton, at the overgrown edge of a sportsground. Earlier, I had taken it singly on two occasions in my former garden at Blackheath (Chandler, 1969, *Hoverflies of Kent:* 164), and once in Windsor Forest (1982, *Ent. Rec.* **94**:230) – again on umbels in both places. My experience might appear to suggest a possible specific connection with Umbelliferae such as certainly exists in the case of the far commoner *M. labiatarum* Verr.

The interesting little spot in Maryon-Wilson Park already referred to remained so, unfortunately, for only another year or two, its deterioration being due in part to increased shading by overhanging trees and in part to the smothering of the goutweed flowers by rampant nettles. Numerous buttercups around seem very unproductive of hoverflies other than the odd *Cheilosia albitarsis* Mg. I did, however, manage to net off an umbel a ♂ *C. scutellata* Fall. (3.vii.83, a very warm day); whilst the 'hitherto unrecognized [male] *Cheilosia*' mentioned at the end of my note cited above was kindly determined for me by Mr. A. E. Stubbs as that provisionally noted in his book as 'species E'. This, I understand, has since been referred to *C. proxima* Zett., a species I have seen very little of and never befor in S. E. London or Kent (despite the records in Chandler, *l.c.* 180). The Charlton specimen was among buttercups. – A. A. ALLEN, 49 Montcalm Road, London, SE7.